

# 3M™ Glass Bubbles Hollow Glass Sphere (HGS) Series for drilling & cementing fluids

## Engineered to perform under pressure



3M Glass Bubbles HGS Series help you achieve and maintain fluid target density specifications under demanding downhole conditions. Explore industry publications showcasing where 3M glass bubbles can help you create value in your cementing, drilling, completion and workover applications.

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CEMENTING APPLICATIONS >

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FLUID APPLICATIONS >

# White Papers on Lightweight Cementing Applications

Europe, Middle East & Africa	Asia Pacific & Australian Continent	United States of America & Canada	Latin America	Global/Others
<a href="#">SPE-183681 - An Overview of Experimental Studies Examining the Reliability of Hollow Glass Spheres as a Density Reduction Agent in Oil Field Applications</a>	<a href="#">SPE-196262 - Liquid-Bead Solution for Lightweight Cement Slurries</a>	<a href="#">SPE-190079 - Lightweight and Ultra-Lightweight Cements for Well Cementing - A Review</a>	<a href="#">SPE-176038 - Engineered Highly Crush-Resistant Cement Slurry to Prevent Lost Circulation</a>	<a href="#">SPE-194918 - Comparative Study of the Mechanical Properties of Reduced Density Cements</a>
<a href="#">SPE-175189 - Investigation of Stability of Hollow Glass Spheres in Fluids and Cement Slurries for Potential Field Applications in Saudi Arabia</a>	<a href="#">SPE-182250 - Novel Cementing Solutions to Impede Lost Circulation with Highly Crush-Resistant Lightweight Cement System and Engineered Fibers</a>	<a href="#">SPE-189277 - Impact of Alkali-Silica Reaction ASR on Structural Integrity of Light-Weight Wellbore Cement</a>	<a href="#">SPE-139344 - Methodology for Cementing Low-Fracture-Gradient Gas Wells: Application in Cashiriari Field, Block 88</a>	<a href="#">SPE-193350 - Design and Application of a New High Performance Lightweight Thermal Cement</a>
<a href="#">SPE-166849 - Optimized Particle Size Distribution Lightweight Cement at Low Temperatures: Case Study from Eastern Siberia, Russia</a>	<a href="#">SPE-176063 - Application of Optimized Particle-Sized Lightweight Cement Technology to Improve Integrity on Surface Casings in Myanmar</a>	<a href="#">SPE-182399 - Use of Hollow Glass Spheres in Lightweight Cements - Selection Criteria</a>	<a href="#">SPE-107696 - Engineering Evolution for an Effective Zonal-Isolation Process in Production Casings for the Antonio J. Bermúdez Basin in South Mexico</a>	<a href="#">SPE-181347 - Development and Rheological Characterization of Suspension of Hollow Glass Beads</a>
<a href="#">SPE-134336 - Cementing In Unconsolidated Sand West Delta Deep Marine Fields, A Case History</a>	<a href="#">SPE-165796 - Prehydrating High-strength Microspheres in Lightweight Cement Slurry Creates Value for Offshore Malaysian Operator</a>	<a href="#">SPE-178772 - New Approach In Lifting Cement In Highly Depleted And Naturally Fractured Formations</a>	<a href="#">SPE-104066 - Superior Zonal Isolation Provided by Ultralightweight Cementing Technology Increases Profitability of Wells in Difficult-to-Cement Areas</a>	<a href="#">SPE-119535 - Guidelines for Appropriate Application of Non-Foamed Ultra-Lightweight Cement Slurries</a>
<a href="#">SPE-113090 - Evaluation and Optimization of Low-Density Cement: Laboratory Studies and Field Application</a>	<a href="#">SPE-163083 - Improving Heavy-Oil Well Economics with Hollow Microsphere Cementing Solutions: Case History</a>	<a href="#">SPE-175918 - Achieving Top of Cement; An Engineered Solution for Loss Zone Wells in the Bakken</a>	<a href="#">SPE-102229 - Zonal Isolation Within Highly Fractured Carbonates in Southeastern Mexico—Special Cementing Operations</a>	<a href="#">SPE-106053 - Innovative Ultralightweight Spacer for Cementing Jobs Without Nitrogen or Diesel</a>
	<a href="#">SPE-158092 - High-Strength, Low-Density Cement Pumped On-the-Fly using Volumetric Mixing Achieves Cement to Surface in Heavy Loss Coal Seam Gas Field</a>	<a href="#">OMC-2011-083 - New Class Of Microsphere Improves Economics And Allows Circulation Where Previous Designs Suffered Losses: A Case History</a>	<a href="#">SPE-98124 - Ultralightweight Cementing Technology Sets World Record for Liner Cementing With a 5.4 lbm/gal Slurry Density</a>	<a href="#">SPE-94541 - New Technology for the Delivery of Beaded Lightweight Cements</a>
	<a href="#">SPE-132694 - Designing of Ultralight Slurry for Liner Cementation: Case Study</a>	<a href="#">SPE-114143 - Applications of Ultra Low Density, Operationally Simple, Non-Foamed Cement Slurries — Case Histories</a>	<a href="#">SPE-92970 - New Ultra-lightweight Cementing Technology Proven with Case Studies, Combines Benefits of Current Leading Methodologies</a>	
	<a href="#">SPE-101810 - Lightweight Slurries—A Success Story of Application in Low-Fracture-Gradient and Depleted Fields for Improved Cementation</a>	<a href="#">SPE-97847 - Case Study of Ultra-lightweight Slurry Design Providing the Required Properties for Zonal Isolation in Devonian and Mississippi-an Central Appalachian Reservoirs</a>	<a href="#">SPE-92187 - Preventing Lost Circulation Using Lightweight Slurries with Reticular Systems: Depleted Reservoirs in Southern Mexico</a>	
		<a href="#">PETSOC 2003-125 - A Comparison Between Foamed and Lightweight Cements</a>		

# White Papers on Drilling, Completions and Workover Fluid Applications

Europe, Middle East & Africa	Asia Pacific & Australian Continent	United States of America & Canada	Latin America	Global/Others
<a href="#">SPE-206447 - Hollow Glass Spheres HGS in Drilling Fluids: Case Study on Preventing and Mitigating Total Losses</a>	<a href="#">SPE-171465 - Combination of Subhydrostatic Drilling and UBD to Extend the Life of Mumbai High Giant Oil Field</a>	<a href="#">SPE-208701 - Development Methodology for Ultra-Lightweight Drilling Fluids Using Hollow Glass Beads</a>	<a href="#">OTC-26162 - Alternative Technologies in Drill-In Fluids for Depleted Reservoirs</a>	<a href="#">SPE-181347 - Storable Liquid-Bead System as Lightweight Additives for Oilwell Cementing</a>
<a href="#">OTC-31070 - Drilling with Glass and Air: Using Hollow Glass Spheres to Address a Wide Ranging Drilling Challenge in a Safe, Efficient and Cost -Effective Manner</a>	<a href="#">SPE-132251 - Lightweight Water-Based Mud Using Glass Bubbles for Drilling a 6-in. Horizontal Section in a Gunung Kembang Development Well</a>	<a href="#">OMAE2017-62132 - Lightweight Hollow Glass Microspheres Drilling Fluid Flow Through Nozzles</a>	<a href="#">SPE-62899 - Field Application of Glass Bubbles as a Density-Reducing Agent</a>	<a href="#">SPE-30500 - Use of Hollow Glass Spheres for Underbalanced Drilling Fluids</a>
<a href="#">SPE-199665 - Low-Density Invert Emulsion Drilling Fluid Enables Recovery of Oil Reserves in Extremely Depleted Reservoirs: A case History From Valhall, Norway</a>	<a href="#">SPE-130327 - Assessment On The Performance Of Hollow Glass Microspheres In Low Density Fluids For Workover Programs In Fractured Basement Reservoir, Vietnam</a>	<a href="#">SPE-174010 - Hollow-Glass Sphere Application in Drilling Fluids: Case Study</a>		
<a href="#">SPE-183681 - An Overview of Experimental Studies Examining the Reliability of Hollow Glass Spheres as a Density Reduction Agent in Oil Field Applications</a>	<a href="#">SPE-125702 - Hollow Glass Microspheres to Reduce the Density of Drilling Fluids in the Mumbai High, India and Subsequent Field Trial at GTI Catoosa Test Facility</a>	<a href="#">1115-0078-JPT - Benefits of Applying Hollow Glass Spheres to Drilling Fluids</a>		
<a href="#">SPE-182973 - Investigation of The Reliability of Hollow Glass Spheres as a Density Reduction Agent for Drilling Fluids under Physical Impact Forces Simulating Drilling Conditions</a>	<a href="#">SPE-108423 - Increasing Production by Maximizing Underbalance During Perforation Using Nontraditional Lightweight Completion Fluid</a>	<a href="#">OTC-25044 - Hollow Glass Microspheres: An Option for Dual Gradient Drilling and Deep Ocean Mining Lift</a>		
<a href="#">SPE-182878 - Drill-in Fluids Design and Selection for a Low-Permeability, Sub-Hydrostatic Carbonate Reservoir Development</a>		<a href="#">OMAE2014-23401 - Density and Drag Reduction With Hollow Glass Additives</a>		
<a href="#">SPE-175737 - Investigation Of The Stability Of Hollow Glass Spheres In Drilling Fluids In Diverse pH Environments And Assessment Of Potential Field Applications In Saudi Arabia</a>		<a href="#">SPE-167619 - Rheological Properties of Drilling Fluids Mixed with Lightweight Solid Additives</a>		
<a href="#">SPE-175189 - Investigation of Stability of Hollow Glass Spheres in Fluids and Cement Slurries for Potential Field Applications in Saudi Arabia</a>		<a href="#">SPE-82276 - Improving Performance of Low Density Drill in Fluids with Hollow Glass Spheres</a>		
		<a href="#">SPE-38637 - Field Application of LightWeight Hollow Glass Sphere Drilling Fluid</a>		